

Adapt to drought and
water scarcity now



BENEFIT OF GOVERNANCE
IN DROUGHT ADAPTATION



Roadmaps to improved drought resilience measures' implementation

Collection of recommendations to the six practice partners
in the DROPP project

Author | Governance Assessment Team DROPP

Date | May 29, 2015

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This report is part of the DROP project ("Benefit of governance in DROught adaPtation") of the INTERREG IVb North West Europe programme.

1. Introduction

This “roadmap” document provides an overview of the recommendations that followed from the Water Governance Assessments that were produced by the DROP governance assessment team. It belongs to the INTERREG IVb DROP project (“Benefit of governance in DROught adaPtation”) of the INTERREG IVb North West Europe programme. The topic covered by DROP is drought. We aim to take early action to adapt to climate change, with a focus on adapting to drought. The North West European area will increasingly face drought periods that harm agricultural production, nature and fresh water supplies. Although the problem is not always very visible, the problem is there and will worsen in the future. Adaptation action taken now will reduce costs in the future. An optimal water governance setting is crucial for effective drought adaptation in North West Europe. The concept of “governance” is widely used both in practice and in policy science literature, but with a great variety of meanings. In the Governance Assessment Tool developed in the DROP project we therefore specified what in our view is the essence of governance conditions for the feasibility of drought resilience measures.

The governance assessment tool used in this project is made up of a ‘matrix’ like model consisting of five elements and four criteria, which we use to analyze the drought related water governance issues in the NW European regions involved in the project. This “Governance Assessment Tool” is used to reveal the ‘essence’ of the drought adaptation and governance in the six NW European regions investigated. It is used to diagnose the regional setting and to formulate regional roadmaps for optimizing regional settings.

In our concept of governance we do not include the resulting (inter)action related to policy or project implementation as part of the governance concept, but rather see governance as the context under which such (inter)actions take place. This implies that the results of the analysis will NOT tell what the best options for increasing drought resilience or more sustainable water resources management are. The model and thus the assessment tool that is derived from it do not evaluate what measures are more or less apt for attaining drought resilience. Rather the model draws the attention to the governance conditions that can hinder water resources management policies and projects under complex and dynamic conditions.

The kind of policy advice that the model and the tool can generate is thus not about with what measures the practitioners could better reach drought resilience, but what barriers and hindrances in the governance context they will have to reckon with or try to circumvent in trying to adapt to drought in their practitioner contexts. It evaluates the governance context from the perspective of the intended action (programs, plans, projects), not the impact that these intended actions have on sustainability or resilience (the more natural science side of the problem). The ability to provide an assessment of the contribution tot sustainability and resilience of an intended action is part of the body of the expertise of the local water managers.

Each of the following chapters presents a series of possible recommendations to deal, from a drought perspective, with the water governance context in the region. The recommendations are partially based on comparing the specific region’s context with Governance Team members’ knowledge of other water management systems, including a comparative analysis with the other five

regions studied in DROP. However, it must be noted that the Governance Team's knowledge of the governance context is based on just two field visits (and associated interviews with representatives of a variety of stakeholders and including archival research). Thus these recommendations should be validated for local applicability by local experts. However, in each chapter we raise some questions that need to be asked of and for the region as it moves forward with water management, and climate change adaptation.

In this "roadmap" document the recommendations that result from the governance context analyses are specified in the following Chapters 2–7. A concluding Chapter 8 will discuss some more general recommendations, partly stemming from the regional ones, but with relevance and transferability to other regions in North West Europe.

2 Vechtstromen

This chapter presents a series of possible recommendations to deal, from a drought perspective, with the water governance context in Vechtstromen. In these recommendations we will not deal with possible emergency measures like the restrictions of use during prolonged periods of water scarcity. For these we refer to the Groot Salland recommendations. Here we will concentrate on the preventive measures for increasing drought resilience that are central stage in the most vulnerable areas of Vechtstromen like the northeast of Twente.

2.1 General national awareness raising

While the subject of droughts and fresh water shortages gets some attention in the Netherlands it is still a low profile issue. This has the disadvantage that financial and political support for preventive measures to increase drought resilience is limited and the relative priority of such measures is weak when they compete with other objectives. A background is that the most populated parts of the Netherlands have an artificial water system that allows to manage water levels to prevent droughts. On top of that water scarcity is often related to the prevention of saltwater intrusion by using large quantities of freshwater to flush these artificial waterways. All of this makes the problematic of the “higher sandy soil areas” where dependency on rain water and ground water increases the risk of drought damage for both nature and agriculture, a subject that does not easily retain priority in the political centre of the Netherlands.

Luckily there are many initiatives to counter this tendency. In the east part of the Netherlands the recent ZON agreement (a working plan on fresh water supply for the east of the Netherlands between relevant provinces, water authorities, municipalities, NGO's, sector organizations and companies) shows the alertness and preparedness of many partners to bring the problematic to the foreground and demonstrate the willingness to invest in its solution. Likewise earlier initiatives like the “Deltaplan Higher Sandy Soils” and related manifestations have been pushing the subject on the national agenda, resulting in a “Freshwater Supply” sub-programme in the new Delta Programme.

Nevertheless a recommendation is that continuous efforts are made to keep this issue on the national agenda and hereby secure lasting support for the measures for increasing drought resilience in vulnerable areas that will take a considerable number of years to be realized. Because large parts of the south of the country are facing exactly the same problematic, it is recommended to do this in close collaboration with not only the eastern, but also the southern water authorities. Thereby it is important to secure that the labelling of the problematic as “freshwater supply” instead of drought resilience does not dilute the attention for the special problematic of the higher sandy soil areas.

2.2 Further capacity building in consensual project management

As a consequence of the relatively low saliency of the drought problematic, but also related to the objective of the water authority of Vechtstromen to maximize the value of water measures for a broad range of societal goals, the drought resilience projects in the northeast of the Twente region are not regulative in character, but supportive, voluntary and consensus oriented and aiming for the integration of various sectoral goals. In our conclusions we already stated that this is given the governance context likely the most efficient way to proceed and also that the project managers are doing a good job at this. However the period that these projects will take to increase the resilience of the whole vulnerable area might be so long that from time to time new or extra project managers will be involved. The other way around: the expertise and experience gained from the drought projects in consensual project management could also be beneficial for project managers in other water projects. For these reasons we recommend to organise venues for inter-collegial exchange and learning, for instance by regular sessions.

2.3 Alternatives for voluntary approaches in preventive action

The voluntary and consensual approach might be well-adapted to the characteristics of the governance context, still the Governance Team wondered whether this approach should not be accompanied with elements of a more regulative approach to prevent it from getting stuck once the areas with the most willing stakeholders have been dealt with. We acknowledge that a consensus oriented policy style that is dependent on positive attitudes of the stakeholders involved cannot easily be combined with a more regulative one and thus should be carefully considered. Nevertheless having a regulative framework that not directly impacts on stakeholders, but fixes the goals to be achieved, could set a context that is somewhat “harder” yet doesn’t hinder a consensual strategy as a means to achieve those goals. As such the further elaboration of the ideas developed in the project “Steering on minimal flow requirements” (“Sturen op basisafvoer”) could be a good basis.

2.4 From farm level approach to full area level approach

The extension of local drought resilience projects wherever good chances for realization have occurred and stakeholders could be convinced to cooperate had led to a wide array of very nice projects. The basic idea is that each generation of projects will convince other stakeholders to participate in a next round and thus create a bandwagon effect. This way many local project areas have been improved in terms of drought resilience. This approach has great virtues and should be continued. However this will not necessarily lead to the full coverage of the water system in somewhat bigger areas, for instance watersheds of creeks and small rivers. Therefore it might be necessary to add to the small scale voluntary project approach a new sort of approach. In this approach somewhat bigger areas than separate farms could be the scale, for instance containing one or two dozen farms of which for instance two have been already involved in showcase projects in previous rounds, attempting to make the coverage by drought resilience measures for that area complete and create

synergy between the measures. The water authority could try to collaborate with the farmers' association and even to have them taking the lead in convincing the remaining land owners that are not yet included in one of the smaller scale projects to join in an area based approach. In our interviews with representatives of the farmer association we encountered a good insight in the necessity to cover larger areas to have full benefit of drought resilience measures and a fair degree of willingness to take up such a role. Obviously further elaboration of this idea with them should make clear whether such a bigger role is realistic and feasible.

2.5 Giving farmers options to temporarily influence the water level while normally keeping it higher

To increase drought resilience, maintaining a higher water level in ditches and drainage canals than until now is often desirable. Farmers normally have some resistance against this idea. At several moments during the year they need to be able to enter their land with machinery and thus they regard relatively high water tables as disturbing their operation. A popular alternative is to make use of drainage systems that are partially controllable ("peilgestuurde drainage"). These enable the land owners to temporarily lower the water table when necessary and thus increase the willingness to accept higher water tables for the rest of the time. An innovative project working with such approach has been gaining much support by the farmers and their association. A difficulty here is that in this project a lot of subsidy has been spent. Upscaling the approach to wherever the hydrological situation might make it possible is desirable and can increase willingness to collaborate in drought resilience measures, but will require new cost-sharing arrangements.

2.6 Creating a long term outlook and a vision for each area

When many stakeholders have to align in multi-purpose (but in any case also drought-related) measures, it is important that the outlook for the vulnerable region as a whole and visions of the desired status of the subareas that should be dealt with are as clear as possible. Vechtstromen has had a good experience with this way of working when long term complex and dynamic implementation process should gradually realize a better status of the water system. An "iconic" example is the restoration of the Regge River (the main water course of the Twente region), but also the reconnection of large parts of the region to the Regge River by realizing a new river, de Doorbraak (the "Break-through") and the present works on the Vecht river are examples. The "compass" effect of such an integrated multi-sectoral vision on both the scale of northeast Twente and more specifically subareas with their own characteristics is a proven requirement for such long term efforts and should also be further developed in this case.

2.7 Limiting the responsibility of the water authority to “normal” fresh-water demands

The vulnerability for droughts and water scarcity has logically two sides: a supply and a demand side. At the supply side hydrology and climate change form a relevant setting. Some of the drought resilience measures try to bring the hydrology in better shape, others try to decrease the water demand. However it is also possible that simultaneously other developments create extra demands and extra vulnerability. This happens for instance when new industrial or drinking water production extractions are projected or the area of high value crops with a specific minimal water need is increased, even into areas where natural conditions make this risky. While fresh water supply is generally regarded a public task guaranteeing the provision of sufficient water at sufficient quality in such highly demanding cases might not be. The national Advisory Committee on Water has recently suggested that it is justifiable when water authorities limit their public tasks in such a way that working towards a basis level of drought resilience is strived for, but risks beyond that level are a matter of private entrepreneurship and risk taking, not only in legal sense but also in policy terms. In fact this is also the case with the opposite, the protection against flooding. The expectation is that clarity on the limits of the goals to be strived for might help to increase awareness, prevent unwise investments that reckon on public expenditure to protect their interests and enhance own private precaution.

3 Flanders

3.1 Development of an integrated central vision and multi-objective management by public authorities

The development of integrated, long-term strategic objectives as part of a strategy paper or ‘vision’ on water scarcity and droughts could lead to a more comprehensive approach to droughts in Flanders. Currently, the topic of droughts is only a topic within the environment ‘silo’, and not recognised as an issue within other policy sectors. The aim could be to achieve uptake of some drought-relevant criteria in the planning priorities and measure implementation of other policy sectors, but also of VMM planning. VMM’s ongoing modelling efforts could be the basis for a more integral vision.

It is clear that drought is not the most burning question that Flemish water management faces. However, the case can still be made for incorporating drought elements in the implementation of planning activities (e.g. Water Framework Directive, Floods Directive, agricultural policy). In view of Climate Change and growing water demand (e.g. due to intensification of agriculture), there is justification to make use of this potential. Especially between VMM and agriculture agency, discussions are necessary about vision and strategies to achieve goals.

Lead by this central vision, different planning programmes could be reviewed for potential to incorporate drought-relevant elements. Current guidelines could be modified so that measures are multi-objective. An example in case could be to adjust flood reservoir management rules so that they also include drought objectives. In general, the incorporation of drought in flood planning seems particularly important. Furthermore, the development of new instruments should keep the interconnections between topics in mind, so they can be developed coherently.

Guidance should also be developed for local authorities in charge of permits for adaptation measures of private actors – this may require clearing hurdles between different authorities. (An interviewed farmer reported waiting 5 years for the authorisation of a water retention basin.) Interviewees talked of “different positions in government” slowing down progress. Dialogues across agencies and between different levels to harmonise positions and increase coordination could address these issues.

3.2 Fostering the mainstreaming of drought risk and drought preparedness into private actors’ activities

VMM’s DROP pilot is a risk-communication tool which will provide farmers with the means to adjust their short-term behaviour so they avoid the short-term risk of droughts. Interviews showed significant potential to expand this kind of risk communication and information exchange to other economic sectors. They could for instance take the form of dialogues on drought adaptation. Interviews

showed that actors are willing to exchange ideas on impacts, possible solutions, etc. A key topic for the important agricultural sector could be the issue of growing water demand outstripping water availability (water scarcity).

VMM could take the role of fostering these exchange initiatives, which could be facilitated by external consultants. The initiatives should not focus exclusively on VMM providing information to private actors/economic sectors, but should also enable the exchange of experience and best practices between actors of one sector and between different sectors. The objective of these initiatives could be to establish voluntary agreements/codes of practice within and possibly between sectors.

A second role for VMM could be to generate data addressing identified data gaps (see also Recommendation 7). Providing reliable drought-risk related data to private actors can enable them to proactively change their practices - just as the DROP pilot is currently doing for the agricultural sector. Interviewees of different sectors highlighted that providing drought-risk related data and good risk communication is key for businesses to incorporate drought risks into their risk-management practices (see also Recommendation 4).

Novel channels for raising awareness need not be costly: an interviewee suggested highlighting the possibility of water right restrictions during droughts (already existent in current legislation) in relevant water rights documentation. The communication of risk to those actors with underdeveloped risk perception is the basis for them incorporating these risks into their operations, acquisitions and long-term planning.

3.3 Expanding approach to include networking, demonstration projects, showcasing

The approach used by VMM in the DROP pilot is based on using models to make a scientific case for drought action on the part of stakeholders, in this case farmers. This same approach, in which solid modelling results are used to create awareness of impacts and as basis for a discussion that addresses responses, was also used successfully in the implementation of the Floods Directive. (A similar observation can be made for the Vechtstromen pilot, in which the waterboard also follows an already proven approach, based mainly on strong networking and consensus building with stakeholders. Both organizations can be thus seen as following an established 'organizational logic' in their approach to droughts.)

However, there are also limitations to the approach that VMM is currently following. For instance, it seems not well suited to evaluate measures that are more reticent to modelling (e.g. farming techniques to reduce erosion, combination of measures). It could also run into problems in areas where data availability is an issue, for instance surface water use volumes. Finally, although it generates high quality arguments, it also takes a long time to do so. It would thus seem valuable to expand VMM's strategy to include additional approaches, e.g. use of pilot measures, demonstration projects, showcasing actions, best-practice exchange schemes, and working more strongly in network-building and improving relationships with actors. These would be particularly relevant in regions which are already facing issues. Interviewees highlighted the benefits of showcasing combined approaches, and

held that showcases are a good basis for discussions. Pilots and showcasing also provide additional benefits: because of their media affinity, these initiatives can help communicate risk to stakeholder groups and the broader public (see Recommendation 4).

3.4 Increasing awareness for droughts / water scarcity

It seems clear that awareness for drought issues is still lacking among Flanders stakeholders. It would seem necessary to increase the awareness in different stakeholder groups, especially the groups which do not incorporate the risk in their operations. As basis the developed scientific model can be used, but the more technical approach should be combined with a more interactive approach. As mentioned above, involvement of the local level could be improved with showcasing actions which could then be taken up by other stakeholders, e.g. farmers. The most important audiences would be intermediaries and multipliers, such as farming associations or energy industry associations. The awareness should also be raised slowly so that in case of a drought event, at least a low media attention already exists. Interviewees suggested that water pricing for actors other than the broad public is an important tool to increase awareness for resource scarcity.

3.5 Increase flexibility in planning processes by incorporating stakeholders in measure selection and prioritisation

Some interviewees suggested they see their involvement in current planning processes as occurring too late in the process. In addition to being consulted for the implementation of measures, they argued for more involvement in the planning phases, in particular measure selection, prioritisation and calibration. In other DROP regions (e.g. in the areas of the two Dutch pilots), authorities have made very positive experiences with strongly participatory approaches: the additional time and resources required in the planning phases would be balanced by increased collaboration, increased ownership, and less resistance (e.g. lawsuits) in the implementation phase. This kind of participation could be used as a bargaining chip in discussions that address options for drought resilience, thus hopefully getting stakeholders such as farmers on board of the process.

3.6 Foster drought contingency planning for relevant economic sectors

As a second stage to Recommendation 2, the possibility of requiring drought contingency planning for important and water-relevant economic sectors could be reviewed. Companies of these sectors could be required to prepare contingency plans for their operations during drought periods, thus increasing preparedness and reducing economic damage during drought periods. Positive experiences with this kind of planning instruments have been had overseas.

3.7 Evaluate the importance of data availability gaps, and prioritise which to address

Expanding the breadth of water management to include drought issues will require making available and collecting additional data, typically needed for an adequate evaluation of measures, their prioritisation, monitoring their effectiveness, etc. VMM could take on the task of analysing data availability and identify which data gaps should be addressed and in which priority. Data regarding volumes of water abstracted/used by surface water users (and sometimes even data regarding surface water rights) is often incomplete in North-West Europe. This kind of data can be key to identifying where the potential for drought adaptation lies, implementing measures that make use of that potential, and enabling private actors to incorporate drought risk into their actions (see also Recommendation 2).

3.8 Improve relationship with political level – establish dialogues with other authorities

Drought and water quantity issues are often taken care of in different authorities and ministries. The relationship with other authorities could be improved to tackle these issues. Also networking with the relevant stakeholders could lead to a further enhancing of relationships. Participation of different levels, e.g. for farmers could be offered; with this approach stakeholders are taken on board not only in the official stakeholder participation process of a regulation or a strategy. Representatives are included at early stage of decision making and can furthermore increase the relevance of proposals of the authority on the political level.

3.9 Prepare for the moment drought climbs the political agenda

In Flanders, as well as in other DROP pilot regions, drought seems to be a second-order problem when compared to major issues with long historical experience such as floods. However, even if droughts occur with less frequency and have less visibility, they still have the potential to inflict serious and even crippling damages on different economic, political, environmental and social sectors. This raises the question of how to ‘push’ a second-order issue. Apart from the first two options to push the issue that are already dealt with in previous recommendations, the above reasoning also suggests to use the third strategy mentioned here. The three following strategies can be distinguished:

- a) Aiming to place drought on the agenda on its own, as an independent problem.
- b) Addressing drought by ‘piggy-backing’ other issues, i.e. including drought-relevant measures in different planning initiatives and ensuring coherence of plans with drought objectives.
- c) ‘Plans in drawer’: prepare a strategy for when a drought event makes the topic climb the agenda and receive political attention.

These approaches are complementary, and the simultaneous use of all three seems to be the best means for increasing drought resilience in Flanders.

3.10 Follow process of disengagement of municipalities

The disengagement of municipalities is not seen as a major problem by the interviewed stakeholders. This seems mainly due to municipalities being well connected with the district and provincial level. Nevertheless, the impact of the disengagement cannot be foreseen at the moment; therefore we suggest observing the consequences this has on water management over time. Furthermore, the municipalities should be involved in the local showcases which are implemented on the ground and also kept on board of the drought management process.

3.11 Transboundary water management

All large Flemish rivers come from other regions. When addressing drought issues, the whole river basin should be taken into account, because Flanders is depending on activities of the upstream regions. Especially, discussions with the neighbours Germany and France should be focused. The discussion should take care of water quantity and quality. Interviewees suggested strong impacts of upstream countries on their water volumes and quality, and highlighted benefits of an agreement on water volumes that cross the border.

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4 Eifel-Rur

4.1 Use current possibilities and develop options to manage water demand

Although the water system is managed comprehensively and sophisticatedly in the Eifel-Rur, there seems to be a mismatch between the instruments in use for floods, water quality, and groundwater, and those addressing quantitative aspects of surface water management (including those relevant for drought purposes). Whereas the former have profited from recent European regulations that have driven comprehensive updates of planning objectives and tools, the latter is rather the result of the historical development of regional water regulations. For this reason, numerous elements seem to some degree incompatible with each other and with modern water resources management. For instance, there seems to be no real incentive structure for measures targeting water demand – which would have overall benefits from a drought perspective.

a) Develop strategy for addressing current inefficiencies

From a climate adaptation perspective, but also from a broader governance objective of reducing resource use conflicts and thus enhancing planning security for economic actors and the economic potential of the region, there are a number of possibilities that are currently being missed. These inefficiencies could be reduced if a better use is made of existing instruments that could reduce unused water rights to bring them in line with actual use – including realistic development potential for the local industry in the future. Whereas some instruments to this purpose exist, updating water rights may be resisted by affected users, which means that authorities need to count with political will behind their initiative. They would probably also require an improved resource base to address this extra task over several years, as resources already now seem stretched quite thin.

b) Review water rights and water pricing strategies

New, additional instruments which provide adequate steering mechanisms for managing water demand could also be implemented. For instance, current water charges are linked to water use, and not to water rights. Including a link to the size of a water right in the charges, for instance by making charges both water rights and water use (e.g. weighting them in an average) could help address current inefficiencies and missed opportunities. Interviewees highlighted that owners of water rights would hang on to existing surplus rights for possible future expansion of operations. “Old” rights often provide more legal guarantees than newer ones, which creates unwillingness to trade in old rights for new rights.

c) Create incentives to explore alternative water supply options

Incentives for increased water efficiency (e.g. water recycling) are not felt everywhere, as water recycling comes at a cost (of energy). There seem to be no initiatives in place exploring alternative water supplies, e.g. rainwater harvesting, significant process water recycling, etc. An impulse to increase

process water recycling could be given by making creating an economic case (e.g. making it financially beneficial) for the private companies that are the largest water users.

4.2 Develop a comprehensive and up-to-date database on water rights and water uses

Related to the previous point are the significant data issues affecting surface water. Up-to-date information would not always be available, both for the different types of surface water rights, as well as for the different types of actual uses of water. Options such as systematic water metering do not seem to be in discussion. The lack of data would be related to the lack of updated legal requirements mentioned in the previous point.

An adequate management of water resources requires comprehensive and up-to-date data on these points. This is a necessary basis for understanding the system and evaluating the potential for increasing system resilience, e.g. by water demand management. Again, a push for data improvement would probably require both political will and to some extent additional resources. The benefits of increasing the water management system's resilience would in all probability far outweigh the expenditures.

4.3 Diversify strategies for drought preparedness by expanding debate to water scarcity and climate change

It seems a hard task to convince actors of the benefits of working on drought preparedness, as drought events in the region occur very far in between. Most interviewed stakeholders do not evaluate drought as a priority for their work. In consequence, it may be worth considering addressing droughts – at least partially – within other, broader initiatives. For instance, the topic of water scarcity (structural) rather than drought (short term and very far in between) could prove a better banner under which to propose actions that increase system resilience. Climate change can play a role in these debates, as it is predicted that climate change will increase resource use conflicts. There are also some signs of intensification of water usage (e.g. farmers shift to specialized crops requiring occasional irrigation) – a debate in terms of water scarcity can take up these developments and highlight the benefits of increasing resilience. At the same time, measures specifically addressing drought preparedness should not be neglected.

4.4 Search for synergies between drought preparedness and advisory services/flood prevention plans

There seems to be a potential for synergies between measures addressing water scarcity and droughts, and other initiatives being implemented in the region. For instance, the possibility of including water quantity aspects in the current advisory services to farmers (within the context of the Water Framework Directive) would seem promising. Interviewees considered examples such as those

of the Somerset region (using moisture sensors to address irrigation needs more precisely and thus reduce water use), in which actors have an economic benefit (reduced costs of irrigation) as very viable.

There is further potential in the incorporation of drought topics and measures into flood prevention planning.

4.5 Authorities' review of decision-making processes: goalposts and stalled processes

Stakeholders report of some planning processes being somewhat stalled, with little progress over the last 2-3 years. The deadlock would be a result of trying to achieve consensus and keeping to the traditional voluntary approach in topics which are contentious due to significantly different interests and the high price tags of relatively minor concessions. It would seem that the planning process requires a mechanism for addressing these kinds of impasses. Some stakeholders also wished a clearer guidance on the overall process objectives (the "goalposts") from the responsible authorities. In some cases there may be the requirement for authorities to take a somewhat stronger role. There would also seem to be room for a heightened role for authorities in controlling the on-the-ground implementation its regulations.

4.6 Develop crisis plans to enhance preparedness to drought

The water management system seems still somewhat immature when it comes to "exceptional circumstances" due to droughts. There are no management plans/contingency plans that would address water uses in drought periods, or a clear prioritization scheme for the different kind of uses. The situation is managed using phone calls and ad-hoc consultations between WVER and the district government. It is not clear if there is added value to the ad-hoc nature of these approaches, or if the management framework would profit if these situations were formalized. Such an initiative could have the additional benefit of working as a tool for risk communication and incentive for action for other stakeholders.

4.7 Develop strategies to maintain in, and add actors to, the planning processes

Strategies could be developed to maintain in, and add actors to, the planning processes. Municipalities in particular seem to be finding it very hard to participate in water management, as many are facing extremely significant resource bottlenecks. Particularly the financing possibilities of any possible measures addressing drought should be given thorough attention. Other actors can be addressed by demonstrating the benefits of particular initiatives, e.g. by local showcasing of the implementation of certain measures.

4.8 Increase synergy with farmers

Farmers are a stakeholder group of relevance in the downstream area of Eifel-Rur and that seem to be in a position to impose their own agenda to a great extent. There seems to be a reluctance to collaborate with water management objectives (e.g. when measures do not coincide with agriculture aims). For instance, municipalities with strong farming presence would resist repurposing some areas of land for WFD Programmes of Measures, although the legal basis is clearly against them. It could be relevant to try to evaluate how to make the relationship with farmers more productive when it comes to drought preparedness so as to avoid this kind of deadlocks in drought planning. An option would be to explore the additional synergies between the water board and farmers on water quantity (with a special focus on possible bottlenecks during the summer season), water quality, or on unrelated topics.

5 Somerset

5.1 Fast Water Versus Slow Water – Getting Beyond Policy Silos

While we should not dismiss the need to deal with the impacts of devastating floods and the concentration of resources and political will needed to do so, the way that this is often approached from a governance perspective is particularly problematic. Solutions being suggested after the floods of 2013/2014 for the Somerset region – dredging as the solution for both the short and long term mitigation of flooding – can be conceptualized through the use of the term ‘Fast Water’. That is, by framing the primary problem for adaptation and resilience of this region as flooding it naturally concentrates the debate of solutions towards the removal of water from the region as quickly and swiftly as possible. This engineering solution replicates the notion that this is crisis management against the threat of flood. It should be noted that there is not consistent scientific support that dredging is that effective as a flood management tool, particularly when a long term perspective is taken into consideration.

Other stakeholders such as RSPB (Royal Society for the Protection of Birds) who are focused on the environmental impacts of these floods for nature, and especially bird wildlife, have suggested that dredging is an inappropriate response, and approaches such as improved catchment management for hydraulic retention would reduce flood risk. This approach is about ‘Slow Water’ – slowing the water down in the system, and providing a different approach to the long term mitigation of flood risk. This catchment based approach focused on slowing water down in the system at all times of the year reportedly would provide a greater level of resilience of the system to flood events. This approach of slowing and retaining water at a landscape scale in the system is also seen to be an approach that would reduce drought risk.

However, Slow Water may require a change to the problem framing of resilience and adaptation. By recognizing the seriousness and need to address the devastating impact of floods, while still acknowledging that there is also a very real existing and emerging threat of for water scarcity in the region, changes the range of strategies and instruments that could be used to effectively mitigate variability and extremes. This more joined up approach may also mean that the future of this region becomes characterized through adaptation and resilience, rather than crisis management of extreme events.

So if both floods and droughts are seen to be a problem for the region, why are we not planning for these issues in a joined up way? Why are the debates around flooding and water scarcity so incoherent, so fragmented, so contradictory? This largely seems to be an issue of fragmentation which is explored below.

5.2 Recognising the Tidemarks of Influence of Flood Recovery on Drought and Water Scarcity Governance for the Somerset Region

It is important to recognize the need for linked up water management in for Somerset. The reason for the importance of linking up both drought and flooding experiences in Somerset is in light of recent years events – the drought experiences of 2010-2012, a smaller regional flooding event in Somerset in 2012, and a much more devastating flood in 2013/2104 (Thorne, 2014). There is a risk, in light of the types of approaches being suggested as solutions for the flooding crisis, that ‘engineering only’ approaches to risk management for climate change will be prioritized in the Somerset region. The first wave of discussions about flooding issues for Somerset are occurring largely in isolation from discussions about wider environmental issues (e.g., biodiversity), and joined up and integrated approaches to water management that would take a catchment wide approach to measures for drought, water scarcity and flooding. However, the Somerset Flood Action Plan might be one step towards considering a linked up approach to catchment management although the realization of that plan is yet to be achieved. The Somerset Water Management Partnership, co-ordinated by the Somerset County Council - attempts to promote an approach to flood risk and water management in a more sustainable way, for example, using a whole catchment approach such as integrated catchment management (Forest Research, no date). Although such a catchment based approach is supported by DEFRA (Department of Environment Food and Rural Affairs) as a way to improve the quality of the water environment – particularly to satisfy the Water Framework Directive (WFD) (DEFRA, 2013) - and promoted as a way forward for the Flood Action Plan (Cameron, 2014) it does not strongly feature as a way forward within recent formal flood policy in the region (Environment Agency, 2015).

A joined up approach to drought and water scarcity governance – pre 2013/2014 flooding – was seen to be occurring. Our initial research visit in 2013 showed us that although floods were also seen at that time to be a dominant issue for the region, there was a fairly large amount of intensity from most stakeholders that drought and scarcity was also an issue for the region (particularly related to nature and agriculture), and that there was a lot of work happening to find solutions for drought politically and on the ground. In fact it could be argued that out of all of the case study regions in the DROP project, it had one of the strongest definitions of drought and water scarcity as a problem for the region (both historical and computational knowledge), a strong set of measures and instruments for dealing with water scarcity and drought, and as a result of the dryness in 2010-2012 an emerging and positive partnership approach to water management, and specifically drought. This DROP project has not made an assessment of the flooding policy that has developed since the 2013/14 floods (see instead the ESRC funded Winter Floods project which explores the development of policy post-flooding in Somerset). However, the political response to the flooding – both in terms of the unravelling of media attention and the resultant policy response – potentially will influence and undo the ‘good work on drought governance’ achieved during the droughts of 2010-2012, and the voluntary work towards collaborative approaches within the region by key stakeholders.

For example, although the process still had to be perfected in terms of instruments and measures and processes of communication, the Environment Agency were a key player in the ‘collaborative’

approach being taken to drought communication and adaptation strategies across the region. However, as a result of the floods in 2013/14 as identified by McEwen, Jones & Robertson (2014):

...the Environment Agency (EA), the UK environmental regulator and its head, former Labour MP Chris Smith, were charged by the affected communities, their political representatives, and others, with various alleged failings. A particularly central and contentious focus fell upon how the EA were managing this famously wet landscape, and its many natural and man-made water courses. They were vociferously accused of reducing the level of dredging on the main rivers (the Parrett and Tone) that drain into the Bristol Channel. The EA faced questions, criticisms, calls for immediate action and policy reform in local meetings, local and national broadcast and print media, and on social media, which together caused a 'media storm'.... The very existence of the Agency [EA] was called into question (McEwen et al., 2014, p. 326).

This is problematic as the relationships that were built between the EA and a range of stakeholders across the catchment have been potentially compromised when it comes to drought management due to the way they were portrayed as an organisation during the floods. Such an experience has undermined their position in terms of the EA being key 'knowledge' brokers of climate change impacts and processes for adaptation. It also potentially reduced the EAs legitimacy in any future interactions with the Somerset regional community, and relevant stakeholders with whom they were initiating these collaborative drought adaptation efforts. This is partially about 'resources' (not just financial but also social and political), and a reduction of the EA's resources to engage with legitimacy with the regional community about issues of climate change.

McEwen et al (2014) reflecting on the 2013/2014 floods talk about social science research that encourages processes of 'remembering' flood histories as a way to increase the resilience of communities to future flood events. While this sort of social science approach is important, and necessary, to aid recovery and adaptation of communities it is still focused only on one aspect of water management for the region. The ways that drought and periods of water scarcity are experienced and remembered may be just as important for communicating and adapting to ongoing environmental change in the region. Just focusing on flooding histories might potentially be maladaptive, with the extremities of weather experienced by the region (and to be experienced by the region in climate change scenarios) ignored. Using social science approaches to bridge the gap between flood and drought policy, for example diverse representations of water histories (as opposed to just flood histories) may be important way of developing at least the images of resiliency in communities to all sorts of extreme events.

5.3 Creating Coherence/Connectedness Between Relevant Policy Areas

One of the significant issues highlighted through the Somerset case study has been the way that droughts and water scarcity are dealt with within complementary policy areas. Misalignments in influential policy areas is an ongoing issue for the region. For example, although there are some positive and increasing features as to the types and ranges of stakeholders involved and policies being developed specifically in regards to drought and water scarcity, the connectedness between these

policies and other policy areas is still limited. There are significant implications of the fragmentation of flooding and scarcity into separate debates. Equally, while the new UK Water Bill offers opportunity to fundamentally reconsider the connection of these issues of flooding and scarcity management for agriculture, nature and drinking water; fractured thinking still dominates. There also remains a separation between issues of land use planning (within the Somerset region, and in other regions in the DROP case studies) and a linked up approach to flood risk management, and drought risk management. There needs to be greater coherence and connectedness between relevant policy areas. Framing these problems as separate may restrict the discussion of the potential solutions, strategies and instruments that are possible to create a resilient water future for the region, and may cast the solutions for one aspect of climatic variability (flood) against another (drought).

5.4 Creating Greater Coherence Between Drought and Water Scarcity Instruments and Measures

The extent of the regulated and voluntary measures, instruments and strategies for drought and water scarcity governance regionally in Somerset, and in the UK more generally are substantial (particularly compared to other regional case studies). However, there is a general question of the coherence between these measures that have been initiated at various levels and by various stakeholders in the Somerset. This may also be wider than a regional issue (ie., this incoherence is somewhat embedded in the regulatory definitions of stakeholders in water management processes and policies). For example, while there are clear ‘hierarchies’ of activities related to drought and water scarcity in the Somerset region (even related to the emergency measures to be taken in a civil emergency related to drought), some stakeholders were still unclear about their role in the broader process of drought management, in both adaptive, and crisis management, situations.

The drought period in 2012 did allow some opportunity for greater clarity to be achieved in various stakeholders roles in initiating drought instruments and measures (including initiating conversations amongst stakeholders before certain ‘triggers’ in drought plans had been breached). However, given the number and scale of these activities - both preventative measures and reactionary measures in actual drought situations – it is suggested that greater clarity of these is achieved through greater communication and collaboration between stakeholders who have statutory and voluntary responsibilities in the process. This will be particularly important to rearticulate following the 2013/2014 floods, and the potential erosion of legitimacy of the EA’s role in environmental and water management in the Somerset region. This re-articulation of roles and responsibilities post 2013/2014 floods will be important to ensure that the relationships underpinning these drought plans, drought permits, and drought orders (and related requirements for behavioural change of different stakeholders) will enable the smooth transition into these processes when there is next a drought experience.

There has been a political reluctance to talk about the issues of drought and water scarcity in the Somerset region following the flooding period of 2013/2014. The floods of 2013/2014 could have been used as an opportunity to communicate with the regional community and stakeholders about the increasing probabilities of extreme flooding and drought events for the region. After all, in 2010-2012 there had been an increasing period of dryness and water scarcity for the region. The period of

2010 – 2014 has been significant in terms of early signs of climate change in the region at both ends of extreme. And yet both scarcity and flooding events in the UK continue to be characterized by mismanagement and governance failures (see Walker, 2014 for a discussion of these issues specifically related to UK Water management and water scarcity). Other research projects are exploring the implications for policy development after periods of crisis such as the Somerset floods, including media analysis (see the ESRC funded Winter Floods project run through Exeter University).

5.5 Promoting Catchment Management – as a Flexible and Collaborative Governance Process *and* an End Goal of Water Management

What is important to discuss, is the implications that such framing of extreme events as ‘mismanagement’ has on broader discussions about the future of water management (and related policy area) development for the region in a way that will support effective adaptations to drought and water scarcity event. Beyond the context of mismanagement, a discussion needs to happen about what the levels and moors are being governed for. In a very unique way in Somerset, farming, nature, and people are layered over one another on this watery landscape. While in fact, this is a discussion about ‘what the levels are for’ has been happening in Somerset for decades (as a conservative estimate, some could argue it has been happening since the middle ages, Clout, 2014), there needs to be a (re)articulation of the relationship between drought and flooding in the region is needed.

A discussion of the types of solutions and actions that could deal with both drought and flooding is needed, at all political levels. In the aftermath of the flooding it was difficult to see how such a measured debate could in fact be initiated – after all these were lives and livelihoods that were devastated by the flooding. As previous research has shown, water is materially and socially a highly emotive subject –whether through its overabundance, its lack, or when polluted (Sultana, 2011). The use, control and conflicts around water shape peoples everyday experiences with water. Sultana (2011) talks about this in geographical contexts where there is water scarcity, but we would argue that it is equally relevant in contexts of overabundance of water. Water in these landscapes has a substantial emotive aspect – it intersects with experiences of place, livelihoods, and social, economic, political and environmental futures. In fact in these policy decisions about water – whether in regards to its abundance or lack in the same landscape – it is these areas that are being directly intervened with. The discussion of the future of water scarcity for an area concentrating on the future of water abundance is an emotive and contested conversation. Nonetheless, it is a fundamentally important one. This recommendation calls on leaders and stakeholders in the Somerset region to continue collaborative processes of water governance across the widest possible range of stakeholders possible, to ensure that a diversity and balance of views from these stakeholders are catalogued, and that policy decisions reflect this full view of opinion.

6 Vilaine

Taking into account the main positive dimension of the Vilaine water governance i.e. the ability to develop an integrated water management at the basin scale, these recommendations are orientated toward a better incorporation of more “drought concerns” into this governance scheme. They are also devoted to enhance more intensity as well as flexibility within this water governance.

Five main recommendations can be formulated:

6.1 Create a task force dedicated to climate change impacts on the territory within the existing water management network in order to raise drought awareness

In the case of the Vilaine, there is a clear lack of sensitivity towards drought issues due to a very favourable situation in terms of water availability in the area until now. An outreach effort is necessary in order to strengthen the awareness of water users and water managers of the area. Such an effort could pass first through a better understanding of the impacts of climate change in the specific Vilaine territory. The efficient actor-network in water management, which is one of the strengths outlined in the case of the Vilaine, could then be fruitfully mobilized around drought issues and more generally around water scarcity.

To that respect the Local Water Commission (CLE) of the main instrument devoted to the water management, the SAGE-Vilaine, has a special role to play in mobilizing the resources and interface with local actors. Geographical committee can play a special role tailored to specific situations: estuaries, Natura 2000, etc.

In the first place, a special CLE meeting devoted to climate change for the Vilaine basin can be proposed as a first attempt to let stakeholders and water managers aware of the potential impacts of climate changes in their territory.

Moreover, the creation of a task force dedicated to climate change impacts can be recommended in order to maintain this first interest at the CLE level.

This sensitization of the actor-network in water management toward climate change issue would enable to increase awareness of all stakeholders about the potential impacts of climate changes on water and related activities in the Vilaine territory.

6.2 To enhance knowledge about climate change water related impact in the specific Vilaine area

This task force would collect all the data related to the impacts of climate change on the territory of the Vilaine. These data should be used to identify and if possible quantify drought issues related to

climate changes, and their translation in terms of water availability as well as their consequences for potential water uses.

On the basis of this state of the art, the Task force must also enhance the knowledge on climate change impacts on the territory through specific studies to be undertaken. Three main issues could be investigated to that respect: (i) agriculture, (ii) drinking water delivery and (iii) tourism as they represent the more important issues for the Vilaine basin. Such a development would require a better knowledge about interconnections between surface and underground water resources and could be supported by a monitoring of withdrawals, not initiated yet. Moreover, as in other Drop project pilot-sites, it will be important to link flood and drought associated risks in order that the solution for flood do not worsen drought situations and vice-versa.

6.3 To develop a global *foresight* analysis in order to identify the potential types of drought situation in the basin and the means to better prepare Vilaine stakeholders

A step further a better knowledge about the impact of climate change in the Vilaine basin will be to better anticipate the consequences for human activities as on the ecological status of the basin.

Within the SAGE instrument, an initial identification of sensitive areas related to low flow water was conducted especially for areas located at the eastern part of the Vilaine catchment that lead to produce specific rules to be respected. One can propose that a comprehensive approach of the sensitivity of the area as regards to drought related to climate changes is undertaken, which would allow to establish a typology of geographical sectors and of activities sensitive to climate change impacts. A more accurate assessment of the vulnerability of these sectors and territories, i.e. a precise evaluation of the consequences of drought (or water scarcity) for each type of activity and space would allow to better anticipate, by stakeholders, the impact of a reduction of water resources.

6.4 Support the development of integrated drought/water scarcity management

Finally such a foresight analysis could lead to identify the means to be used in order to help stakeholders to take into account (into their activities) these potential climate change impacts on the Vilaine catchment area.

To that purpose, one can propose to elaborate a “drought” plan not only related to water but also to soil. In fact, most recent droughts in the region were agricultural droughts. As far as water is concern, a more comprehensive and effective policy aiming at reducing water consumption and withdrawals can be recommended. However, anticipatory drought management relies not only on the regulation of water level and withdrawals, but also on technics that both survey and help to keep moister in soil, which is of paramount importance for agricultural activities.

Such anticipatory “vulnerability assessments” of soils would allow overcoming the only crisis management presently prioritized by water actors regarding drought issue, by identifying in advance the adapted behaviour to be implemented.

Such a plan could also be related to other planning documents such as the one related directly to climate change which usually rely upon other type of actors (i.e. SRCAE mostly in the hands of Regional Council, State regional representative and Environmental and Energy saving Agency: ADEME). Joint actions between CLE and those actors are much recommended.

6.5 Sharing low flow forecasts with reservoir management interested parties

One of the DROP project outputs is the development of a tool for managing low flows and enhancing reactive adaptation at the scale of multi-purpose reservoirs, with an application to the Arzal dam. Sharing decision-driving information is essential to insure that the reservoir management meets the standards of openness and transparency. It can also engage early cooperation and postpone water shortage situations. Furthermore, numerical tools can help to corroborate decisions or to put in evidence risks that may not have been foreseen, contributing with scientific arguments to deal with potential conflicts among stakeholders. As such this tool may provide more flexibility to water management at the level of the Arzal Dam.

7 Groot Salland

7.1 Develop an integrated understanding and approach to managing drought

In areas where freshwater resources are crucial both for agricultural production and the protection of nature areas, the impacts of drought such as low water levels and soil moistures can be detrimental. Various policies and initiatives at multiple governance levels will have implications regarding the design and implementation of the measures for preventing and alleviating such impacts. The EU policies such as Natura 2000 and regional initiatives such as the ZON agreement and the irrigation policy are at their infancy regarding the incorporation of drought adaptation and alleviation measures. The water boards in the east and south of the Netherlands are recommended to use this opportunity for putting forward the specific context of the region in terms of drought vulnerability and intensifying their efforts for making sure that drought-related measures are sufficiently elaborated in these policies.

Another aspect that could significantly benefit from an integrated approach is the treatment of flood and drought as separate policy issues. Despite the historic role of floods in shaping Dutch water management, there is also an emerging emphasis on the “double-goal” of managing flood and drought together. The pilot project that has been implemented by the WGS is a typical example of such an approach. It is recommended that such integrated measures are intensified when introducing other measures such as renovations in the water system and mechanisms for monitoring and evaluating the indicators on water availability and consumption. A final recommendation regarding monitoring and evaluation is the upscaling of monitoring mechanisms, for instance through creating system-level knowledge on the water budget to monitor the water use in different sectors (which are mainly agriculture and environment in the Salland Region) and define actions that can be taken by different actors at different levels. The complicated actor network of water management in the Netherlands makes it a big challenge to hold a single actor responsible for integrating all the knowledge regarding different aspects and for having an overview of the overall water resource situation and the water balance. However, as the pressure from drought impacts increase the competition among the water user sectors, development of such comprehensive monitoring mechanisms, at least in the eastern Netherlands, could be inevitable in the near future.

7.2 Raise farmers’ drought awareness towards creating ownership and drought-sensitive water use

As in many other regions or the world, farmers in the Salland region can be key actors for reaching both economic and environmental goals. In this regard, the communication of drought-related information, particularly the drought-related risks, would be crucial. Information sharing tools that both deploy the technical knowledge and take into account the local knowledge and needs of farmers can be developed and made accessible to the farmers by also considering the legal requirements of creating and sharing such data. For instance, providing regular information to the farmers about

the hydrological situation in their plots could directly increase their awareness about the drought conditions. It is also important to establish clear rules as to when and why farmers are not allowed to withdraw groundwater and/or surface water. For instance, decreasing groundwater levels is as a local phenomenon; if the level drops in a field, it goes back to normal in a few weeks when it rains. With the new irrigation policy, farmers are not allowed to pump groundwater near a nature area, as this will negatively affect the groundwater level in that area. Farmers can easily understand and agree with such rules when the reasoning behind them and their relevance is communicated. Establishment of such rules would also indirectly contribute to another governance issue, namely the balancing of supply management with demand management, given that the current functioning of the water system is dominated by a supply-oriented approach. As the impacts of climate change is likely to put pressure on the availability and accessibility of freshwater resources, the management of the water demanded by farmers would become a major concern regarding the sustainable use of water in irrigation. Effective implementation of measures such as the monitoring of notifications for groundwater extraction and the metering of water withdrawals at the field level could contribute to the management of water demand.

7.3 Enable the active involvement of non-governmental organizations towards creating shared responsibilities

NGOs such as environmental NGOs and farmer organizations have positive intentions for improving the current situation, yet they lack the mechanisms and resources for representing their interests at higher decision-making levels. For instance, the LTO lacks the technical capacity to contribute to the debates on climate change in general, and drought in particular. Similarly, the NMO represents all the local NCOs in Overijssel, but its limited capacity in terms of financial and human resources leads to underrepresentation at the regional level. Their involvement is further threatened by the cuts made in the funds allocated for directly participating in relevant projects or initiatives. Active involvement of environmental NGOs and farmer organizations, through information sharing can broaden the perspectives for understanding drought and create more willingness to share risks.

Despite the expected benefits of increasing the involvement of NGOs, it is also acknowledged that many questions regarding division of risks and responsibilities would need to be addressed by the changing nature of the involvement of these actors. The improvement of information sharing and communication mechanisms among the actors would be recommended for facilitating a fair and clear distribution of responsibilities. Given that the water governance system is open to designing new participatory initiatives, the ZON declaration can be instrumental for redesigning the role of NGOs in drought adaptation. The ZON declaration refers to the co-responsibility of all relevant stakeholders, while in its current form is currently too broad to elaborate on how to share the responsibility among different stakeholders. During the process of stipulating the details and implementation mechanisms of the ZON declaration, it would be advisable to define mutually agreeable and feasible mechanisms to assign fair and clear responsibilities to all the involved stakeholders, with a particular emphasis on not associating the level of responsibilities directly with the level of financial contribution.

8 General recommendations on drought resilience management in northwest Europe

In this concluding chapter we will not try to summarize the 40 recommendations made to the regional practice partners. Rather we will present some of our more general observations and recommendations partly stemming from the regional ones, but with relevance and transferability to other regions in North West Europe.

Variety requires tailored action

Each of our six regional reports contains some specific backgrounds, analyses of the governance conditions and some recommendations on how to deal, from a drought perspective, with the water governance context in the region. The recommendations are partially based on comparing the specific region's context with the Governance Assessment Team members' knowledge of other water management systems, including a comparative analysis with the other five regions studied in DROP. The team's knowledge of the governance context is based on two rounds of field visits and associated interviews with representatives of a variety of stakeholders and including archival research.

In the six regions studied there is a big variety of drought measures implemented – involving inter alia drought prediction models, building of infrastructure for improved water level management, natural water retention measures, and farmer-targeted assistance to improve irrigation practices. This variety reflects that the natural situation in the various regions of northwest Europe is so varied that there is a need for tailored action. While everywhere there is a need for increased insight and data processing to better understand the dynamics of the water system regarding drought issues, the best measures are highly dependent on the geo-hydrological situation and structure of the water demand. However, as we have learned from the comparison of the Flanders and the Dutch cases, also the governance context has a clear influence on the development of habitual approaches in policy-making and implementation. Some of the variety is not so much the result of physical conditions, but more so of governance settings.

The need for an increased integration of flood and drought management

In our project the UK Somerset case is a clear example of a situation in which the urgency of the big 2013-2014 flood (after several years of droughts) disturbed the balance between drought and flood measures while both are sides of the same climate change adaptation coin. But also in all other cases the necessity of considering surplus water events when taking drought resilience measures (and the other way around) is essential. Recognizing the need to address the impact of floods, while still acknowledging that there is also a very real threat for water scarcity in the Northwest European region, changes the range of strategies and instruments that could be used to effectively mitigate variability and extremes. This more joined-up approach of different forms of water management that is needed draws together a range of lessons for more effective governance of climate change adaptation across the whole of Northwest Europe. We need strategic governance approaches focused on adaptation and resilience of the whole water system rather than crisis management of extreme events.

Continuous attention for awareness raising needed

All across the areas studied we found that the problem awareness among land owners and the general public, and thus many politicians, is still low. This restricts the selection of forceful interventions to increase drought resilience and makes it sometimes more difficult to realize the measures chosen in practice. Based on the visits of the governance team, the discussions with the water authorities and many other stakeholders, and the results of the governance assessment itself, it was possible to reach some major recommendations regarding this central issue of awareness and strengthening the position of drought and water scarcity issues on the public and political agendas in the various countries. We distinguished three major strategies for pushing the position of the drought issue that is still experienced by many as a second-order issue.

(1) Aiming to place drought and water scarcity on the public and political agenda on its own, as an independent problem; For instance, by providing continuous information to the public like in Flanders on the agency's website, or by directly addressing national water planners with a broad coalition of stakeholders like in the Netherlands' Delta programme process.

(2) Addressing drought by "piggy-backing" other issues, i.e. including drought-relevant measures in different planning initiatives and ensuring coherence of plans with drought objectives.

(3) Using a "plans in drawer" strategy by preparing a ready-to-implement strategy for when a drought event makes the topic climb the agenda and receive political attention responding a call for action.

The careful application of a combination of these strategies leads to the best way to position drought issues and bring them more alongside the already recognized importance of dealing with flood risks.

Preparation and implementation of water demand management

Most measures taken are involving the distribution of available water and decreasing the water scarcity during dry periods by making the areas more resilient by improving their water buffering capacity. Water demand oriented measures are until now less taken. However in the future they might need to become more often part of the drought resilience strategy, even in a number of areas in water rich Northwest Europe. This should imply for now already the collecting of data on water rights, the development of uses, and reviewing water prices. Measures and policy instruments should generate incentives for use reduction, which are now often absent as water is still regarded as a free commodity rather than as a scarce resource. Thus fostering the mainstreaming of drought risk and drought preparedness into private actors' activities is important.

The collaboration with farmers proved to be very important in most cases in the DROP project, not only in the two where the pilot project was explicitly addressing agriculture. Increasing the synergies with agriculture, e.g. through farmer advisory services or the inclusion of farmers unions in the design and implementation of measures, seems to be a prerogative for successful demand management.

The management of expectations might be equally important. As long as the abundance of water in North West Europe is taken for granted by water users, the implicit responsibility to protect the water supply is placed by the users on the water authorities. Even though water supply should remain a public task, this does not imply that any new economic activity requiring extra fresh water, or water

of a specific quality, or increased vulnerability for shortages, should be accommodated by the water authorities and tax-payers money. Some investments might not be wise in drought prone areas. Openly discussing the limits of public responsibility might increase the awareness and own preparatory measures of such water users.

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